

WHAT IS CLAIMED IS:

1. A fuel cell power generating system for generating power by electrochemical reaction of hydrogen with oxygen,

5 comprising:

reforming means for producing a reformed gas containing hydrogen by a steam reforming reaction of a fuel;

first power generating means for generating power by electrochemical reaction of hydrogen or hydrogen and carbon
10 monoxide in said reformed gas with oxygen and supplying waste heat and steam resulting from said power generation to said reforming means;

converting means for converting carbon monoxide in said reformed gas into carbon dioxide and hydrogen by reaction
15 of said carbon monoxide with steam;

oxidizing means for converting carbon monoxide ejected from said converting means into carbon dioxide by oxidation; and

second power generating means for generating power by
20 electrochemical reaction of hydrogen ejected from said oxidizing means with oxygen.

2. A fuel cell power generating system for generating power by an electrochemical reaction of hydrogen with oxygen,

25 comprising:

reforming means for producing a reformed gas containing hydrogen by a steam reforming reaction of a fuel;

first power generating means for generating power by electrochemical reaction of hydrogen or hydrogen and carbon monoxide in said reformed gas with oxygen and supplying waste heat and steam resulting from said power generation
5 to said reforming means;

converting means for converting carbon monoxide in said reformed gas into carbon dioxide and hydrogen by reaction of said carbon monoxide with steam; and

second power generating means for generating power by
10 electrochemical reaction of hydrogen ejected from said converting means with oxygen.

3. A fuel cell power generating system for generating power by an electrochemical reaction of hydrogen with oxygen,
15 comprising:

reforming means for producing a reformed gas containing hydrogen by a steam reforming reaction of a fuel;

first power generating means for generating power by electrochemical reaction of hydrogen or hydrogen and carbon
20 monoxide in said reformed gas with oxygen and supplying waste heat and steam resulting from said power generation to said reforming means;

converting means for converting carbon monoxide in said reformed gas into carbon dioxide and hydrogen by reaction
25 of said carbon monoxide with steam;

separating means for separating hydrogen from an emission of said converting means; and

second power generating means for generating power by electrochemical reaction of the separated hydrogen with oxygen.

- 5 4. A fuel cell power generating system for generating power by an electrochemical reaction of hydrogen with oxygen, comprising:

reforming means for producing a reformed gas containing hydrogen by a steam reforming reaction of a fuel;

- 10 first power generating means for generating power by electrochemical reaction of hydrogen or hydrogen and carbon monoxide in said reformed gas with oxygen and supplying waste heat and an emission containing steam resulting from said power generation to said reforming means;

- 15 converting means for converting carbon monoxide in said emission into carbon dioxide and hydrogen by reaction of said carbon monoxide with steam;

oxidizing means for converting carbon monoxide ejected from said converting means into carbon dioxide by oxidation;

- 20 and

second power generating means for generating power by electrochemical reaction of hydrogen ejected from said oxidizing means with oxygen.

- 25 5. A fuel cell power generating system for generating power by an electrochemical reaction of hydrogen with oxygen, comprising:

reforming means for producing a reformed gas containing hydrogen by a steam reforming reaction of a fuel;

first power generating means for generating power by electrochemical reaction of hydrogen or hydrogen and carbon monoxide in said reformed gas with oxygen and supplying waste heat and an emission containing steam resulting from said power generation to said reforming means;

converting means for converting carbon monoxide in said emission into carbon dioxide and hydrogen by reaction of said carbon monoxide with steam; and

second power generating means for generating power by electrochemical reaction of hydrogen ejected from said converting means with oxygen.

6. A fuel cell power generating system for generating power by electrochemical reaction of hydrogen with oxygen, comprising:

reforming means for producing a reformed gas containing hydrogen by a steam reforming reaction of a fuel;

first power generating means for generating power by electrochemical reaction of hydrogen or hydrogen and carbon monoxide in said reformed gas with oxygen and supplying waste heat and an emission containing steam resulting from said power generation to said reforming means;

converting means for converting carbon monoxide in said emission into carbon dioxide and hydrogen by reaction of said carbon monoxide with steam;

separating means for separating hydrogen from an emission of said converting means; and

second power generating means for generating power by electrochemical reaction of the separated hydrogen with oxygen.

7. A fuel cell power generating system for generating power by electrochemical reaction of hydrogen with oxygen, comprising:

10 first power generating means for producing a reformed gas containing hydrogen at an anode by a steam reforming reaction of a fuel and generating power by electrochemical reaction of hydrogen or hydrogen and carbon monoxide in said reformed gas with oxygen, said first power generating
15 means consuming heat required for said steam reforming reaction and recycling an emission containing steam resulting from said power generation to said anode;

converting means for converting carbon monoxide in said emission into carbon dioxide and hydrogen by reaction of
20 said carbon monoxide with steam;

oxidizing means for converting carbon monoxide ejected from said converting means into carbon dioxide by oxidation; and

second power generating means for generating power by
25 electrochemical reaction of hydrogen ejected from said oxidizing means with oxygen.

8. A fuel cell power generating system for generating power by an electrochemical reaction of hydrogen with oxygen, comprising:

first power generating means for producing a reformed gas containing hydrogen at an anode by a steam reforming reaction of a fuel and generating power by electrochemical reaction of hydrogen or hydrogen and carbon monoxide in said reformed gas with oxygen, said first power generating means consuming heat required for said steam reforming reaction and recycling an emission containing steam resulting from said power generation to said anode;

converting means for converting carbon monoxide in said emission into carbon dioxide and hydrogen by reaction of said carbon monoxide with steam; and

second power generating means for generating power by electrochemical reaction of hydrogen ejected from said converting means with oxygen.

9. A fuel cell power generating system for generating power by an electrochemical reaction of hydrogen with oxygen, comprising:

first power generating means for producing a reformed gas containing hydrogen at an anode by a steam reforming reaction of a fuel and generating power by electrochemical reaction of hydrogen or hydrogen and carbon monoxide in said reformed gas with oxygen, said first power generating means consuming heat required for said steam reforming

reaction and recycling an emission containing steam
resulting from said power generation to said anode;

converting means for converting carbon monoxide in said
emission into carbon dioxide and hydrogen by reaction of
5 said carbon monoxide with steam;

separating means for separating hydrogen from an
emission of said converting means; and

second power generating means for generating power by
electrochemical reaction of the separated hydrogen with
10 oxygen.

10. The fuel cell power generating system as claimed in
any of claims 1 to 9, wherein said first power generating
means is a solid oxide fuel cell, and said second power
15 generating means is a polymer electrolyte fuel cell.

11. The fuel cell power generating system as claimed in
any of claims 1 to 9, wherein said first power generating
means is a solid oxide fuel cell, and said second power
20 generating means is a phosphoric acid fuel cell.

12. The fuel cell power generating system as claimed in
any of claims 1 to 9, wherein said fuel cell power generating
system comprises:

25 means for determining whether an output power of a first
power generating means increases or decreases; and

means for decreasing an amount of air supplied to said first power generating means when said output power of said first power generating means increases, or increasing said amount of said air when said output power of said first power generating means decreases.

13. The fuel cell power generating system as claimed in any of claims 1 to 9, wherein said fuel cell power generating system comprises:

means for determining whether an output power of a second power generating means increases or decreases; and means for decreasing an amount of air supplied to a first power generating means when said output power of said second power generating means increases, or increasing said amount of said air when said output power of said second power generating means decreases.

14. A method of controlling a fuel cell power generating system as claimed in any of claims 1 to 9, comprising the steps of:

determining whether an output power of a first power generating means increases or decreases; and decreasing an amount of air supplied to said first power generating means when said output power of said first power generating means increases, or increasing said amount of said air when said output power of said first power generating means decreases.

15. A method of controlling a fuel cell power generating system as claimed in any of claims 1 to 9, comprising the steps of:

5 determining whether an output power of a second power generating means increases or decreases; and

 decreasing an amount of air supplied to a first power generating means when said output power of said second power generating means increases, or increasing said amount of
10 said air when said output power of said second power generating means decreases.